sition and in its effects, and that it ought to be replaced by a somewhat similar mixture, which should be made extemporaneously. Such, for example, as the following, in which the whole of the iodine would remain in solution, forming a homogeneous mixture:

℞.—Iodine, 5 parts.
Iodide of potassium, 6 parts.
Rectified spirit, 50 parts.
Distilled water, 100 parts.

Triturate the iodine, iodide of potassium, and part of the water in a mortar; then add the spirit, and the remainder of the water."—*Journal de Pharmacie et de Chimie*, Aug. 1846, from *Bulletin de l'Académie de Médecine.*

11. *The action of the Acetate of Morphia on Children.*—Dr. MELION believes, from the results of his experience, that the acetate of morphia possesses more powerful anodyne and antispasmodic properties in children than opium. He divides its effects, when internally administered, into three degrees. 1st. All the secretions and excretions of the internal organs become diminished, but the cutaneous exhalation becomes increased; hence the skin becomes moist, and a copious perspiration covers the head and upper parts of the body; but before this effect takes place it shows its influence on the nervous system, and pain and convulsions cease; its influence lasts from three to six hours, the children then pass a quantity of pale urine, and cutaneous transpiration becomes normal.

2d. The nervous system is the first part affected. The child becomes dull, drowsy, and gradually falls into a state of stupor; it lies with the eyes shut or half open, one more so than the other; the ball of the eye may be either fixed or may roll; the pupil is contracted and inactive; the heat of the head is increased, and the scalp and face are covered with copious perspiration; the child murmurs or speaks during its sleep, and moves its upper lip and lower jaw as in the act of sucking; if it awakens from sleep, it desires to drink, and again falls asleep. This state may last for eight or twelve hours.

In the 3d degree, venous congestion shows itself over the whole body, the child lies listless, the skin is purple, the temperature diminished, the pupils contracted and inactive, the cardiac pulsations weak, the respiration slow, the pulse quick, or slow, small, and weak, and all secretions and excretions suppressed. If this state is not quickly removed, convulsions and death ensue.

Dr. M. employed the acetate with great benefit. 1st. In intestinal catarrh, in the chronic diarrhœa of scrofulous children, and in the profuse debilitating diarrhœa of dentition. 2dly. In convulsions arising from the irritation of dentition or worms. And 3dly. In hooping-cough. As it causes drowsiness and stupor, and other nervous symptoms, even in small doses, he considers it contra-indicated in all cerebral or meningeal affections.—*Monthly Journ. Med. Sci.*, Dec. 1846, from *Med. Wurtemberg Correspondenzblatt.*

MEDICAL PATHOLOGY AND THERAPEUTICS AND PRACTICAL MEDICINE.

12. *On Anormal Nutrition and Diseases of the Blood.*—Dr. J. HUGHES BENNETT, in a very interesting paper, (*Monthly Journ. Med. Sci.*, Nov. 1846,) sustains the very correct general principle that diseases of nutrition and of the blood, are only to be combated by an endeavour to restore the deranged processes to their healthy state, in the order in which they are impaired; that for this purpose, a knowledge of the process of nutrition is a preliminary step to the rational treatment of these affections; that the theory of acting directly on the blood is incorrect; and that an expectant system is as bad as a purely empirical one.

"The various modes," he remarks, "in which nutrition becomes impaired, and the blood diseased, can only be understood by passing in review the various steps of the nutritive process. We have already pointed out how pathology and rational medicine must be based upon anatomy and physiology, and there is no

one subject perhaps which is so well capable of illustrating this proposition as the one we are about to consider. For ages medical men have been in the habit of considering the blood to be the primary source of numerous maladies. It will be our endeavour to show, by an analysis of the process of nutrition, that the changes of the blood, and the diseases which accompany them, are not primary but secondary, that is dependent on previously existing circumstances, to the removal of which the rational practitioner must look as the means of curing his patient.

"For the sake of convenience of description and reference, we shall divide the process of nutrition in man into six stages. 1. The introduction into the stomach and intestinal canal of appropriate alimentary matters. 2. The formation from these of a nutritive fluid, the blood. 3. The exudation through the capillaries of a *formative blastema* in certain proportions. 4. The various transformations which the exudation undergoes in the formation of tissues and secretions. 5. The disappearance of those transformed matters, the functions of which are perfected, and the re-absorption of their effete particles into the blood. 6. The excretion of these from the body, in various forms and by different channels.

"These different stages comprehend not only growth, but the processes of assimilation, absorption, secretion, and excretion; and we believe that it is only by understanding nutrition in this enlarged sense that we can obtain a correct explanation of those important affections, which may appropriately be called diseases of nutrition. We shall first, however, consider each of these stages separately.

"1. *The introduction into the stomach and intestinal canal of appropriate alimentary matters.* Alimentary matters have been divided into several groups. The most simple is the modern one of azotized and non-azotized substances. The most important azotized principles are fibrin, albumen, and casein; the most important non-azotized are fat, starch, gum, and sugar. Both animal and vegetable aliments are capable of yielding similar proximate principles, although in different proportions. Those which are most subservient to nutrition, are albumen and oil. Dr. Ascherson, of Berlin, was the first to point out the effects produced by a union of these, and their importance in the formation of every organized tissue. His observations have been confirmed by every observer, and when we regard the proportions in which these principles enter into our food, their presence in milk, the natural food of young animals, their universality in every blastema and organized tissue, and the numerous experiments which prove that they are capable when united, although not alone, of furnishing the conditions necessary for the support of living animals, we are at once led to the conviction that albumen and oil are the chief alimentary matters destined for nutrition.

"Whilst albumen and oil may be considered as types of the chemical division of nutritive substances into nitrogenized and non-nitrogenized, they prove that other conditions than chemical ones are necessary for nutrition. When mingled together they produce an emulsion, identical in structure with that of the milk, that is, containing numerous globules composed of a minute drop of oil, enclosed in an albuminous membrane.* It is probable that the function of the stomach

* "It may be well to point out more particularly how this fact may be easily demonstrated. Place a drop of oil and one of the white of egg, of about equal size, on a slip of glass near each other. Unite the two together by means of a needle, and then by inclining the glass, allow the oil to flow over the albumen. A pellicle will be observed to have formed. Cover the whole lightly with a thin glass, and examine it microscopically with a power of 250 diameters linear. A membrane more or less folded or puckered will be seen to have been formed. If now the upper glass be rubbed gently forwards and backwards upon the under one, the oil and albumen will be mixed together, and the whole will assume the appearance of milk. If this be done dextrously, it will be seen on re-examination microscopically, that all traces of the membrane have disappeared, and that this emulsion presents all the characters of milk.

"Professor Vogel, now of Giessen, although well acquainted with the views of Ascherson, had never succeeded in this experiment, having always rubbed the oil and albumen together in a mortar. Neither had he ever seen the membrane, or globules alluded to, notwithstanding many efforts to do so, until I demonstrated them to him and his class last August in Göttingen."

and intestines consists in separating or converting from the contents submitted to them, albuminous and fatty matters in a fluid state, which, being absorbed, constitute that emulsion observed within the extremities of the villi when they are called into activity.

"In addition to the two classes of alimentary matters alluded to, there is another composed of mineral ingredients, such as common salt, phosphorus, sulphur and lime. These enter in sensible proportions into our food, are found in various tissues and fluids, and are essential to nutrition.

"It is unnecessary to dwell at any length upon the fact that of all the causes of disease, irregularity in diet is the most common. Neither need I do more than merely allude to the equally well known circumstance that of all the means of cure at our disposal, attention to the quantity and quality of the ingesta is by far the most powerful. The peculiar kind of interference with the aliment, which various diseases require, will be illustrated as we proceed further.

"2. *The formation from alimentary matters of a nutritive fluid—the blood.* The exact process by which blood is formed from alimentary matters has not yet been traced by physiologists. In the duodenum the chyme becomes mixed with bile, which produces important changes in it; but the nature of these, and the true uses of the bile are subjects which have not yet been positively determined. The matter absorbed, forms chyle, which, at the upper extremity of the thoracic duct has occasionally been observed to present a reddish tinge. But whether the formation of blood has been there commenced, or whether the redness is owing to a regurgitation of blood from the vessels is likewise a disputed point. When at length the chyle enters the torrent of the circulation, it presents all the characters of blood.

"The blood must be examined structurally and chemically. In structure it consists of numerous yellow corpuscles, a similar number of colourless corpuscles, and a few granules floating in a yellowish fluid, the liquor sanguinis. The liquor sanguinis consists of fibrin dissolved in serum, which has the property when drawn from the body, or under certain other circumstances, of coagulating. The facts connected with this subject are too well known for us to enter upon them minutely.

"It is exceedingly difficult to ascertain the exact chemical composition of healthy blood, but from the analyses which have been made, we may for practical purposes consider its various constituents to be present in 1000 parts in the following proportions: Water varies from 770 to 790 parts. Fibrin from 2 to 3 parts. Albumen from 60 to 70 parts. Corpuscles from 130 to 150 parts. Extractive matters, fat, and salts, from 10 to 20 parts.

"We know from the results of numerous analyses, that these proportions are greatly changed in various diseases, as we shall see when we come to speak of each separately. What we are desirous of alluding to now, however, is the well known fact that one of the most common causes of derangement in the blood is the different kinds of food. M. Denis mentions that in a young girl of good health the globules were represented by the proportion of 132. After 15 days of rigorous diet, they were represented by 85. The other constituents, but more especially the water, albumen, fat and salts, are modified to a like extent by changes in the diet.

"3. *The exudation through the capillaries of a nutritive fluid in certain proportions.* From the blood a fluid blastema is continually exuding through the capillaries for the formation and sustenation of the different tissues of the economy. It is necessary that this exudation should take place to an amount proportionate to that supplied to it by assimilation, on the one hand, and that dissipated by waste, on the other. If more or less be exuded, a morbid condition is occasioned. An increased amount of exudation, if poured forth slowly, gives rise to hypertrophies; if rapidly, to various morbid deposits. A diminished amount of exudation, on the other hand, produces atrophy.

"A normal amount of exudation essentially depends upon the integrity and healthy condition of the capillary vessels. These may be diminished or enlarged in size; they may be obstructed or lacerated, circumstances which, by impeding a healthy exudation, or rendering it excessive, give rise to morbid states. It is an increased exudation from the capillaries which constitutes that pathological

condition we have been in the habit of considering under the general term of inflammation.

"4. *The various transformations which the exudation undergoes, so as to produce the tissues and secretions.* This is now generally considered to take place through the agency of cell growth, in the manner first pointed out by Schleiden and Schwann. It is only necessary for us to say, with respect to this well-known theory, that it is not so universally applicable as its authors supposed. We have already seen that structures may be formed artificially by the union of oil and albumen; and we know that certain filaments, membranes, and even tissues, may be produced by simple deposition from a blastema, independently of the agency of cells. Still it must be conceded that, as regards most of the processes of growth, the theory of cytogenesis offers a very satisfactory explanation.

"Whilst the transformation of some cells is directed to the formation of the tissues, that of others seems to terminate in producing the various secretions. The observations of Messrs. Bowman and Goodsir, render it probable that this is the function of the ultimate cells in glands.

"Irregularities in the quantity or quality of the exudation not only more or less modify the transformations which the tissues undergo in a state of health, but other structures or cells, altogether foreign to the healthy animal condition, may, under such circumstances, be formed. Thus we have pus, exudation, plastic, tubercle, and cancer cells, together with those seen in typhous ulcerations, fungi, &c. &c. All such cells seem to be dependent on the exudation of a blastema, which, from its inherent composition, is not adapted to healthy nutrition. Hence that process is deranged, and an unhealthy or anormal nutrition carried on in a blastema foreign to the physiological state of the body. It is important to remember, however, that the same general laws of growth and transformation preside over the anormal as the normal cells.

"5. *The disappearance of these transformed matters, and the re-absorption of their effete particles into the blood.* During life, whilst new cells are continually formed, the old ones disappear. The latter shrink, shrivel up, and ultimately break down into a finely molecular matter, which passes into the blood through the capillaries, minute veins, and lymphatics. A quantity of effete matter is thus continually entering into the circulation, arising from the decay of all the tissues, but more especially from the muscular, osseous, nervous, adipose, and areolar tissues. The blood globules themselves probably dissolve after having performed their functions, and serve to swell the amount of effete matter in the blood.

"So long as the matters absorbed from the tissues correspond in quantity to the matters exuded and transformed, the physiological or healthy state is preserved. We know, however, that this is continually liable to be disordered from any of the causes we have formerly noticed which derange nutrition. In some cases, absorption takes place with great rapidity, as we occasionally observe after the formation of large abscesses. In others, this process is in no way proportionate to the quantity of matters exuded, as in plethora, hypertrophy, and morbid growths.

"The effete matters thus absorbed into the blood circulate with it, and always constitute an inherent part of its composition. It has been lately contended by Zimmerman that they form the fibrin of the blood, which, instead of being exuded to form the tissues, as has been generally supposed, is excreted from the body by the different glands. "It may be well to recapitulate some of his arguments in favour of this opinion:

"There is no fibrin in chyme, and very little in the chyle, and what is remarkable, much less in the chyle of carnivorous than in herbivorous animals, as horses and sheep. Hunger does not diminish its quantity in the chyle of horses, but on the contrary, rather increases it, if we can rely upon the experiments of Tiedemann and Gmelin, who concluded that the fibrin must get into the chyle through the lymphatics. Since, then, there is no fibrin in the chyme of carnivorous animals, whilst it constitutes so large a portion of their food, the object of digestion must be the transformation of fibrin into albumen. Further, the blood of carnivora contains less fibrin than the blood of herbivora. Again, lymph, that is the fluid part of the blood exuded in a state of disease, is loaded with fibrin, which would not be the case if it were the nutritive constituent of the blood. Lastly, the

experiments instituted by Magendie, Nasse, and others, who transfused blood deprived of fibrin into an animal, show, that after having circulated awhile, it contained fibrin and was coagulable.*

"Independently of the arguments thus cited by Zimmerman, there are others in support of his opinion. It seems extraordinary, for instance, that if the tissues are formed from fibrin, that principle should exist only in normal blood, in the small proportion of from 2 to 3 parts in 1000—a quantity wholly inadequate to build up the tissues. Again, we find the fibrin increased under circumstances where absorption from the tissues is very active, as in inflammatory diseases attended with exudation or emaciation, as in pneumonia, acute rheumatism, phthisis pulmonalis, &c. It seems, then, more rational to suppose that nutrition is dependent rather on the exudation of albumen than of fibrin, and that this latter constituent of the blood is more connected with the decaying than with the formative stage of nutrition. If this opinion be correct, we must regard the increase of fibrin in the blood as an effect, rather than, as some pathologists have supposed, the cause of inflammatory diseases.

"6. *The excretion of the effete matters from the body in various forms, and by different channels.* The circulating fluid having received the effete matters in the manner we have described, again parts with them through the agency of the glands, in the form of various secretions and excretions. Glands are nourished by, and formed like all other textures, but their cellular structure is endowed with the property of secreting different substances from the blood. Thus the cells of the liver secrete bile; those of the kidney, urea; those of the mamma, milk; those of the testis, the spermatic fluid, &c. &c. In this way much of the carbonized and nitrogenized matters, whether received from the assimilation of alimentary substances, or the result of the transformation of the tissues, is again excreted from the system, as bile, urea, &c.

"The mineral matters received into the blood pass through the same process. The lime and phosphorus absorbed from the alimentary canal, unite to form the constituents of bone, and when re-absorbed are excreted under new combinations in the urine and feces. The muriate of soda is decomposed in the tissues. The acid is found in the gastric juice, or is exhaled by the skin, while the soda is excreted with the bile by the liver. Sulphur has also lately been shown to pass out of the system, mixed with bile.

"To complete the physiological changes connected with the function of nutrition, it is only necessary to remember that carbonic acid gas, the result of decompositions in the food and tissues, and water, are continually given off by the lungs, and skin, and that the oxygen which enters the blood through the lungs, is essential to the performance of all those complicated processes which we have enumerated.

"Thus we may consider that there are two kinds of digestion continually going on in the body—one in the stomach and intestines, the other in the tissues; that the blood is the recipient of both, distributing the results of the first to build up the tissues, and of the second to constitute the various excretions. In this manner the circulation of the blood may be compared to a river flowing through a populous city, which serves at the same time to supply the wants of its inhabitants, and to remove all the impurities that from numerous channels find their way into its stream.

"We can now readily understand how derangement in one stage of the nutritive process, more or less affects the others. Thus, if alimentary matters are not furnished in sufficient quantity, and of a proper quality, the blood is rendered anormal, and it necessarily follows that the exudation from it will be anormal also, and its subsequent transformations more or less modified. Again, if secretion be checked, the blood is not drained of its effete matter; and if excretion be prevented, the secretions themselves may enter the blood, and act upon it as a poison.

"A diseased or morbid state of the blood, therefore, may arise from either of the stages of nutrition we have described, being rendered irregular, or otherwise anormal. In whatever part of the chain interruption takes place, it will, if long continued, affect the whole. Thus, a bad assimilation of food produces through

* Zur Analysis und Synthesis, der pseudo-plastichen, Prozesse.

the blood bad secretions and excretions, whilst an accidental arrest of one of the latter reacts through the blood on the assimilating powers. The forms of disease thus arising may be endless, but they may all be traced to the following causes:—

"1. An improper quantity or quality of the food.
"2. Circumstances preventing assimilation.
"3. Altered quality or quantity of the exudation.
"4. An anormal transformation of the exudation.
"5. The accumulation of effete matters in the blood.
"6. Obstacles to the excretion of these from the body.

"Examples in which each of these causes, separately or combined, have occasioned disease, must have occurred to every practitioner. It is true that all general diseases are accompanied by certain changes in the blood, but these changes are to be removed, not by operating on the blood directly, but by obviating or removing those circumstances which have deranged the state of nutrition primarily affected. For instance, a very intense form of disease may be produced in infants, from improper lactation. The remedy is obvious, and we procure a healthy nurse. Ischuria is followed by coma, from the accumulation of urea; we give diuretics to increase the flow of urine, and the symptoms subside. In the one case we furnish the elementary principles necessary for nutrition; in the other, we remove the residue of the process. In both cases the blood is diseased, but its restoration to health is produced by acting on a knowledge of the causes which led to its derangement.

"In the same manner we might illustrate the indications for rational practice in the other classes of causes tending to derange the blood, which we have enumerated. Thus, although there be a proper quantity or quality of the food, there may be circumstances which impede its assimilation; for instance, a too great acidity or irritability of the stomach—the use of alcoholic drinks—inflammation or cancer of the organ. It is the discovery and removal of these that constitute the chief indications of the rational practitioner. Again, the capillary vessels become over distended with blood, and the exudation of liquor sanguinis to an unusual amount takes place, constituting inflammation. How is this to be removed? In the early stage topical bleeding will diminish the congestion, and the application of cold will check the amount of exudation. But the exudation having once coagulated outside the vessels, acts as a foreign body, and the treatment must then be directed to furthering the transformations which take place in it, and facilitating the absorption and excretion of effete matter. This is accomplished by the local application of heat and moisture—the internal use of neutral salts to dissolve the increase of fibrin in the blood, and the employment of diuretics and purgatives to assist its excretion by urine or stool."

13. *Acute Spinal Myelitis.*—Several cases of acute myelitis treated in M. Rostan's wards, have given this professor an opportunity of sketching the features of this affection, hitherto so obscure, and of methodising its principal therapeutic indications. A few only of the prominent points can be here noticed, those on which M. Rostan particularly insists, and which he believes sufficient for establishing the diagnosis. Of these, the summary is as follows: On the one hand, complete retention of the senses and intellectual functions; on the other, various derangements in the sensibility and power of motion in the extremities, and especially the lower extremities. But these derangements in the power of motion and the sensibility, are very variable according to the degrees and different periods of the disease, and it is owing to having for the most part, failed to take account of all the degrees and shades of these symptoms that this affection has been so often misunderstood at its commencement, that is, at the period when energetic treatment may avail to prevent its disastrous consequences. These first symptoms, by which myelitis is announced, are sometimes cramps, more or less frequent, and muscular contractions of longer or shorter duration; at other times pains in the extremities are the only symptoms complained of without any appearance of change in the contractility; in other cases muscular tremors, true convulsive movements come on; lastly, in some the loss of sense and motion appear at once from the commencement. Whatever may have been the initiatory symptoms, it is always by the more or less complete abolition of sensibility and